



FCC 47 CFR MPE REPORT

Shengzhen PICEA Intelligent Technology Co., Ltd

Robot Vacuum

Model Number: HOME-S10U

FCC ID: 2BGN6-SCZN0719

Applicant:	Shengzhen PICEA Intelligent Technology Co., Ltd
Address:	Floor 10, Block A, Han's Innovation Building, No. 9018,
	Beihuan Avenue, North District, High-tech Park,
	Nanshan District, Shenzhen, Guangdong,P.R. China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

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Maximum Permissible Exposure

1. Applicable Standards

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

1.1. Limits for Maximum Permissible Exposure (MPE)

(a) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-10000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-10000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

1.2. MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

2. Conducted Power Result

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	6.56	4.529
	2441	5.68	3.698
	2480	5.08	3.221
$\pi/4$ -DQPSK	2402	6.44	4.406
	2441	5.56	3.597
	2480	4.97	3.141
8-DPSK	2402	6.83	4.819
	2441	5.90	3.890
	2480	5.26	3.357
BLE 1M	2402	4.35	2.723
	2440	3.46	2.218
	2480	5.01	3.170
IEEE 802.11b	2412	16.34	43.053
	2437	15.68	36.983
	2462	15.85	38.459
IEEE 802.11g	2412	15.98	39.628
	2437	15.74	37.497
	2462	15.67	36.898
IEEE 802.11n HT20	2412	16.00	39.811
	2437	15.67	36.898
	2462	15.68	36.983
IEEE 802.11n HT40	2422	16.11	40.832
	2437	15.92	39.084
	2452	16.00	39.811
IEEE 802.11a	5180	13.71	23.496
	5200	14.60	28.840
	5240	15.06	32.063
	5260	14.60	28.840
	5300	14.37	27.353
	5320	14.79	30.130
	5500	14.42	27.669
	5580	13.91	24.604
	5700	14.96	31.333
	5745	13.66	23.227
	5785	14.02	25.235

	5825	13.89	24.491
IEEE 802.11n HT20	5180	13.15	20.654
	5200	13.45	22.131
	5240	14.09	25.645
	5260	14.09	25.645
	5300	15.69	37.068
	5320	15.29	33.806
	5500	13.14	20.606
	5580	12.52	17.865
	5700	14.16	26.062
	5745	13.66	23.227
	5785	14.30	26.915
	5825	14.04	25.351
IEEE 802.11ac VHT20	5180	15.22	33.266
	5200	15.51	35.563
	5240	14.19	26.242
	5260	14.10	25.704
	5300	13.72	23.550
	5320	15.25	33.497
	5500	13.33	21.528
	5580	12.47	17.660
	5700	14.27	26.730
	5745	14.81	30.269
	5785	15.37	34.435
	5825	15.72	37.325
IEEE 802.11n HT40	5190	13.96	24.889
	5230	14.23	26.485
	5270	14.08	25.586
	5310	14.05	25.410
	5510	12.60	18.197
	5550	12.83	19.187
	5670	13.46	22.182
	5755	14.67	29.309
	5795	14.66	29.242
IEEE 802.11ac VHT40	5190	15.69	37.068
	5230	14.77	29.992
	5270	14.24	26.546
	5310	14.47	27.990
	5510	13.18	20.797



	5550	12.60	18.197
	5670	13.41	21.928
	5755	15.66	36.813
	5795	15.82	38.194
IEEE 802.11ac VHT80	5210	13.47	22.233
	5290	15.57	36.058
	5530	12.95	19.724

3. Calculated Result and Limit

Mode	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW /cm²)	Limited of Power Density (S) (mW /cm²)	Test Result
				(dBi)	(Linear)			
2.4G Band								
GFSK	6.56	6±1	7	3.14	2.061	0.00205	1	Complies
π/4-DQPSK	6.44	6±1	7	3.14	2.061	0.00205	1	Complies
8-DPSK	6.83	6±1	7	3.14	2.061	0.00205	1	Complies
BLE 1M	5.01	5±1	6	3.14	2.061	0.00163	1	Complies
IEEE 802.11b	16.34	16±1	17	3.14	2.061	0.02055	1	Complies
IEEE 802.11g	15.98	15±1	16	3.14	2.061	0.01632	1	Complies
IEEE 802.11n HT20	16.00	16±1	17	3.14	2.061	0.02055	1	Complies
IEEE 802.11n HT40	16.11	16±1	17	3.14	2.061	0.02055	1	Complies
5G Band								
IEEE 802.11a	15.06	15±1	16	4.61	2.891	0.02289	1	Complies
IEEE 802.11n HT20	15.69	15±1	16	4.61	2.891	0.02289	1	Complies
IEEE802.11ac VHT20	15.72	15±1	16	4.61	2.891	0.02289	1	Complies
IEEE 802.11n HT40	14.67	14±1	15	4.61	2.891	0.01819	1	Complies
IEEE802.11ac VHT40	15.82	15±1	16	4.61	2.891	0.02289	1	Complies
IEEE802.11ac VHT80	15.57	15±1	16	4.61	2.891	0.02289	1	Complies

Note: WIFI 2.4G and 5GHz bands are share an antenna, can't both the 2.4G and 5 GHz bands operate simultaneously.

End of Test Report